

WELCOME!

The session will begin at 4:00 pm.

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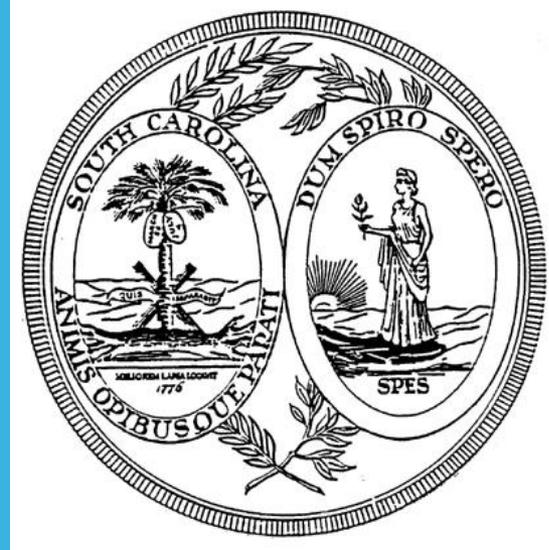
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SCDE SCIENCE FALL VIRTUAL PLO

AUGUST 8TH, 2016

SECONDARY SCIENCE SESSION ONE



OVERVIEW OF TODAY

- Review of Summer Session
 - Example of Standard Transition
 - Instructional Unit Templates example and Timeline for release
 - Starting a Common Language discussion
 - State Assessment changes
- 

OUT WITH THE OLD...

GRADE 7

Ecology: The Biotic and Abiotic Environment

Standard 7-4: The student will demonstrate an understanding of how organisms interact with and respond to the biotic and abiotic components of their environment. (Earth Science, Life Science)

Indicators

- 7-4.1 Summarize the characteristics of the levels of organization within ecosystems (including populations, communities, habitats, niches, and biomes).
- 7-4.2 Illustrate energy flow in food chains, food webs, and energy pyramids
- 7-4.3 Explain the interaction among changes in the environment due to natural hazards (including landslides, wildfires, and floods), changes in populations, and limiting factors (including climate and the availability of food and water, space, and shelter).
- 7-4.4 Explain the effects of soil quality on the characteristics of an ecosystem.
- 7-4.5 Summarize how the location and movement of water on Earth's surface through groundwater zones and surface-water drainage basins, called watersheds, are important to ecosystems and to human activities.
- 7-4.6 Classify resources as renewable or nonrenewable and explain the implications of their depletion and the importance of conservation.

Standard 7.EC.5: The student will demonstrate an understanding of how organisms interact with and respond to the biotic and abiotic components of their environments.

7.EC.5A. Conceptual Understanding: In all ecosystems, organisms and populations of organisms depend on their environmental interactions with other living things (biotic factors) and with physical (abiotic) factors (such as light, temperature, water, or soil quality). Disruptions to any component of an ecosystem can lead to shifts in its diversity and abundance of populations.

Performance Indicators: Students who demonstrate this understanding can:

7.EC.5A.1 Develop and use models to describe the characteristics of the levels of organization within ecosystems (including species, populations, communities, ecosystems, and biomes).

7.EC.5A.2 Construct explanations of how soil quality (including composition, texture, particle size, permeability, and pH) affects the characteristics of an ecosystem using evidence from soil profiles.

7.EC.5A.3 Analyze and interpret data to predict changes in the number of organisms within a population when certain changes occur to the physical environment (such as changes due to natural hazards or limiting factors).

7.EC.5B. Conceptual Understanding: Organisms in all ecosystems interact with and depend upon each other. Organisms with similar needs compete for limited resources. Food webs and energy pyramids are models that demonstrate how energy is transferred within an ecosystem.

Performance Indicators: Students who demonstrate this understanding can:

7.EC.5B.1 Develop and use models to explain how organisms interact in a competitive or mutually beneficial relationship for food, shelter, or space (including competition, mutualism, commensalism, parasitism, and predator-prey relationships).

7.EC.5B.2 Develop and use models (food webs and energy pyramids) to exemplify how the transfer of energy in an ecosystem supports the concept that energy is conserved.

7.EC.5B.3 Analyze and interpret data to predict how changes in the number of organisms of one species affects the balance of an ecosystem.

7.EC.5B.4 Define problems caused by the introduction of a new species in an environment and design devices or solutions to minimize the impact(s) to the balance of an ecosystem.

IN WITH THE NEW...

- Do you see the change? Not just content, but context.
- Fact Recall is not a best practice in any subject area and here we see changes in language to show this.
- What we don't see written out for us here is the connection to SEP's and CCC's.

INSTRUCTIONAL UNIT EXAMPLE

Grade 7 Overview of Units

Unit 1		Unit 2		Unit 3		Unit 4	
PHYSICAL SCIENCE: CLASSIFICATION AND CONSERVATION OF MATTER		LIFE SCIENCE: ORGANIZATION IN LIVING SYSTEMS		LIFE SCIENCE: HEREDITY – INHERITANCE AND VARIATION OF TRAITS		ECOLOGY: INTERACTIONS OF LIVING SYSTEMS AND THE ENVIRONMENT	
Standard		Standard		Standard		Standard	
7.P.2		7.L.3		7.L.4		7.EC.5	
Conceptual Understanding		Conceptual Understanding		Conceptual Understanding		Conceptual Understanding	
7.P.2A	7.P.2B	7.L.3A	7.L.3B	7.L.4A	7.EC.5A	7.EC.5B	
Performance Indicators		Performance Indicators		Performance Indicators		Performance Indicators	
7.P.2A.1	7.P.2B.1	7.L.3A.1	7.L.3B.1	7.L.4A.1	7.EC.5A.1	7.EC.5B.1	
7.P.2A.2	7.P.2B.2	7.L.3A.2	7.L.3B.2	7.L.4A.2	7.EC.5A.2	7.EC.5B.2	
7.P.2A.3	7.P.2B.3	7.L.3A.3		7.L.4A.3	7.EC.5A.3	7.EC.5B.3	
7.P.2A.4	7.P.2B.4	7.L.3A.4		7.L.4A.4		7.EC.5B.4	
	7.P.2B.5			7.L.4A.5			
				7.L.4A.6			
*Science and Engineering Practices		*Science and Engineering Practices		*Science and Engineering Practices		*Science and Engineering Practices	
7.S.1A.2		7.S.1A.2		7.S.1A.2	7.S.1A.1		
7.S.1A.3		7.S.1A.4		7.S.1A.3	7.S.1A.2		
7.S.1A.4		7.S.1A.7		7.S.1A.5	7.S.1A.4		
7.S.1A.5		7.S.1A.8		7.S.1A.6	7.S.1A.7		
7.S.1A.6				7.S.1A.7			
7.S.1A.8				7.S.1A.8			
*CrossCutting Concepts		*CrossCutting Concepts		*CrossCutting Concepts		*CrossCutting Concepts	
1, 2, 3, 4, 5, 6, 7		2, 4, 6		1, 2, 4, 7		1, 2, 3, 4, 5, 6, 7	

*Teachers have the discretion to enhance the selected SEP's and CCC's.



INSTRUCTIONAL UNIT EXAMPLE

Unit Title

Physical Science: Classification & Conservation of Matter

Standard

http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf

7.P.2 The student will demonstrate an understanding of the structure and properties of matter and that matter is conserved as it undergoes changes.

Conceptual Understanding

7.P.2.A All substances are composed of one or more elements. Elements are pure substances which contain only one kind of atom. The periodic table organizes these elements based on similar properties. Compounds are substances composed of two or more elements. Chemical formulas can be used to describe compounds.

New Academic Vocabulary

Some students may need extra support with the following academic vocabulary in order to understand what they are being asked to understand and do. Teaching these terms in an instructional context is recommended rather than teaching the words in isolation. A great time to deliver explicit instruction for the terms would be during the modeling process. Ultimately, the student should be able to use the academic vocabulary in conversation with peers and teachers. These terms are pulled from the essential knowledge portion of the Support Doc 2.0 link below and further inquiry into the terms can be found there. <http://ed.sc.gov/instruction/standards-learning/science/support-documents-and-resources/>

element	atoms	Subatomic particles	protons	neutrons
electrons	Periodic table	Chemical symbol	Atomic number	Atomic mass
period	family	metals	metalloids	nonmetals
compounds	Heterogeneous mixture	Homogeneous mixture	Ionic bonds	Covalent bonds
Chemical formulas	Subscripts	Diatomic molecules		

INSTRUCTIONAL UNIT EXAMPLE

Performance Indicators

Text highlighted below in *orange* and *italicized/underlined* shows connections to SEP's.

7.P.2A.1 *Develop and use* simple atomic *models* to illustrate the components of elements (including the relative position and charge of protons, neutrons, and electrons).

7.P.2A.2 *Obtain and use information* about elements (including chemical symbol, atomic number, atomic mass, and group or family) to describe the organization of the periodic table.

7.P.2A.3 *Analyze and interpret data* to describe and classify matter as pure substances (elements or compounds) or mixtures (heterogeneous or homogeneous) based on composition.

7.P.2A.4 *Construct explanations* for how compounds are classified as ionic (metal bonded to nonmetal) or covalent (nonmetals bonded together) using chemical formulas.

*Science and Engineering Practices:

Support for the guidance, overviews of learning progressions, and explicit details of each SEP can found in the Science and Engineering Support Doc (http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf). It is important that teachers realize that the nine science and engineering practices are not intended to be used in isolation. Even if a performance indicator for a given standard only lists one of the practices as a performance expectation, scientists and engineers do not use these practices in isolation, but rather as part of an overall sequence of practice. When educators design the learning for their students, it is important that they see how a given performance expectation fits into the broader context of the other science and engineering practices. This will allow teachers to provide comprehensive, authentic learning experiences through which students will develop and demonstrate a deep understanding of scientific concepts.

7.S.1.A.2 *Develop, use and refine models* to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

7.S.1.A.4 *Analyze and interpret data* from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing or statistical analysis) to (1) reveal patterns and construct meaning or (2) support hypotheses, explanations, claims, or designs.

7.S.1.A.6 *Construct explanations* of phenomena using (1) primary or secondary scientific evidence and models, (2) conclusions from scientific investigations, (3) predictions based on observations and measurements, or (4) data communicated in graphs, tables, or diagrams.

7.S.1.A.8 *Obtain and evaluate scientific information* to (1) answer questions, (2) explain or describe phenomena, (3) develop models, (4) evaluate hypotheses, explanations, claims, or designs or (5) identify and/or fill gaps in knowledge. Communicate using the conventions and expectations of scientific writing or oral presentations by 1) evaluating grade-appropriate primary or secondary scientific literature, or (2) reporting the results of student experimental investigations.

INSTRUCTIONAL UNIT EXAMPLE

***Cross Cutting Concepts** <http://www.nap.edu/read/13165/chapter/8>

The link above provides support from the Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012) The text in blue and *italicized/underlined* below provides a brief explanation of how the specific content ties to the CCC's.

1. **Patterns-** The National Research Council states, "Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them" (p. 84). *Matter can be classified on the basis of its composition and can be seen in the organization of the periodic table.*

3. **Scale, Proportion and Quantity-** The National Research Council states, "In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance" (p. 84). *The atom is composed of subatomic particles: protons, neutrons, and electrons. The proportion of the subatomic particles affect the properties of an atom.*

4. **System and System Models-** The National Research Council states that this includes "defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering" (p. 84). *The Law of Conservation of Matter supports the functioning system of a chemical reaction.*

6. **Structure and Function-** The National Research Council states, "the way in which an object or living thing is shaped and its substructure determine many of its properties and functions" (p. 84). *The atom is composed of subatomic particles: protons, neutrons, and electrons that affect the properties of an atom. Matter can be classified on the basis of its composition.*

*Teachers have the discretion to enhance the selected SEP's and CCC's.

Prior Knowledge

- 5.P.2B.1 (Properties of Mixed Substances)

Subsequent Knowledge

- H.C.2 (Atomic Structure, Subatomic particles, Bohr models, Quantum mechanical models, Electron configuration, Absorption and emission spectrum, Nuclear processes: Fusion and Fission, Radioactive Decay, Half-Life and radioactive dating)
- H.C.4 (States of Matter, Phase Changes, Intermolecular Forces, Heating curves, Phase changes, Gas behaviors)
- H.C.3 (Properties of ionic and covalent/molecular bonding and compounds, Polyatomic ions, Periodic Table, Naming compounds and writing formulas, Oxidation numbers, Lewis Structure, Periodic Table)

INSTRUCTIONAL UNIT EXAMPLE

Possible Instructional Strategies/Lessons

Strategies and lessons that will enable students to master the standard and/or indicator.

- **Atomic Structure:** Use a variety of informational text sources to research atomic structure and create models that depict the appropriate subatomic particles for specific elements. Include element name, materials, and a summary of what is included in the model.
- **Periodic Table of Elements:** Use Periodic Table to obtain and identify specific information about elements. This resource can be found at http://www.pbslearningmedia.org/resource/phy03.sci.phys.matter.lp_pertable/the-periodic-table-of-the-elements/
- **Steps for Classifying Matter:** Teacher can create an anchor chart and provide the students with the following steps to refer to analyze and interpret data when classifying matter. More information concerning constructing anchor charts can be found at <http://www.weareteachers.com/blogs/post/2015/11/12/anchor-charts-101>.

Steps for Classifying Matter

Is it on the Periodic Table?

- If yes, it is an element. Stop here.
- If no, keep going.

Does it have a chemical formula?

- If yes, it is a compound. Stop here.
- If no, keep going.

Are the different parts visible?

- If yes, it is a heterogeneous mixture. Stop here.
- If no, it is a homogenous mixture. Stop here.

- **Classification of Matter:** In this activity, students are expected to classify matter based on analysis and interpretation of data providing evidence to support the classification. This resource can be found at <https://middleschoolscience.com/2015/08/06/elements-compounds-and-mixtures-classification-activity/>

INSTRUCTIONAL UNIT EXAMPLE

Resources

- Periodic Table and the Elements: A free online resource for students to learn more about the organization of the Periodic Table. This resource can be found at http://www.chem4kids.com/files/elem_intro.html
- Periodic Table: A free online resource for students to learn more about the organization of the Periodic Table. This resource can be found at http://www.ducksters.com/science/periodic_table.php
- Inquiry in Action: A free online resource that provides a variety of instructional strategies as well as best practices for science education. This resource can be found at <http://www.inquiryinaction.org/>
- Mr. Lee's Chemistry Rap: Includes information about atoms, elements, compounds, mixtures, and chemical reactions. This resource can be found at <https://www.youtube.com/watch?v=B0d-fzj9oMQ>
- Elements, Compounds, Substances, and Mixtures: A resource that provides students with background information on the topic. This resource can be found at <http://www.eschooltoday.com/science/elements-mixtures-compounds/introduction-to-elements-compounds-and-mixtures.html>
- What in the World Isn't Chemistry?: An abundance of resources that teachers can adapt to fit the needs of their students. This resource can be found at http://ems.goddardusd.com/page/57823_4

Sample Formative Assessment Tasks/Questions

Additional sample formative assessment tasks/questions for grade bands are located at the end of each of the SEP Support links

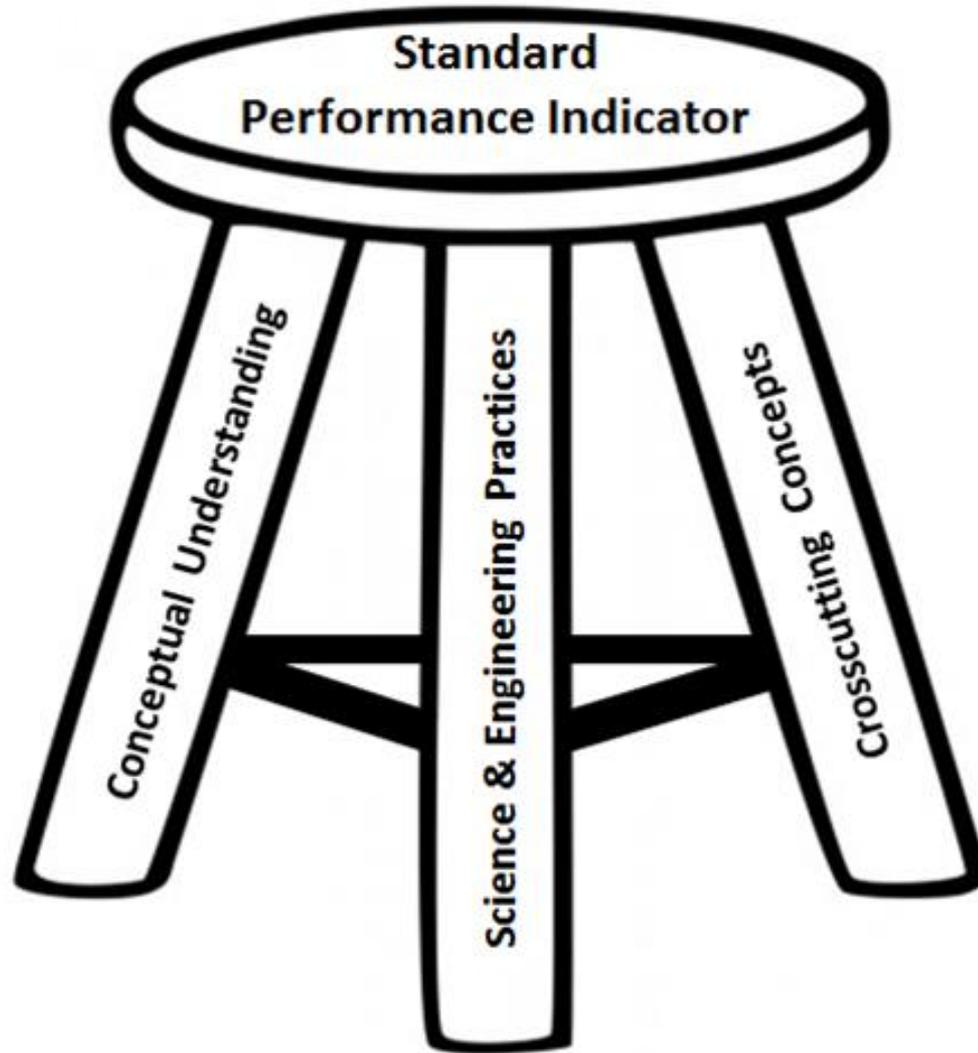
(http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf)

- Create a model of an atom that depicts the structures that compose an atom. Model must include materials, element name, labels and explanations. Students should be able to communicate their ideas and model construction to others.

ANTICIPATED DATES OF RELEASE

- August 10th : 1st units K-12
 - September 14th: 2nd units K-12
 - October-November: Teachers will be constructing the final units for each grade level.
 - Intent is to stay ahead of instruction.
- 

3 DIMENSIONAL LEARNING



COMMON LANGUAGE

- 3 Dimensional Learning
- Standards/Performance Indicators
- Conceptual Understandings
- CCC's
- SEP's

Intended Curriculum: Our Standards...
Enacted Curriculum: How we teach...
Assessed Curriculum: How we assess...

WHY PRACTICES?

- ❖ ***Practice*** refers to doing something repeatedly in order to become proficient
 - ❖ Scientific *inquiry* is one form of scientific practices.
 - So, the perspective in the Framework is not one of replacing inquiry; rather, expanding and enriching teaching and learning of science.
 - ❖ Working with core ideas and practices over multiple years supports learning
 - ❖ Science and engineering require both knowledge and *practice*
- 

SOUTH CAROLINA SCIENCE AND ENGINEERING PRACTICES (SEPS)

Part A.1-8

- 1. Ask questions (science) and define problems (engineering)**
- 2. Develop and use models**
- 3. Plan and conduct investigations**
- 4. Analyze and interpret data**
- 5. Use mathematical and computational thinking**
- 6. Construct explanations (science) and design solutions (engineering)**
- 7. Engage in scientific argument from evidence**
- 8. Obtain, evaluate, and communicate information**

Part B.1 (Some say 9th SEP)

9. Construct or design solutions

4th Disciplinary Core Idea from Framework

❖ Engineering, Technology, and Applications of Science

STATE ASSESSMENT

- The 2014 South Carolina Science standards are written based on *A Framework for K-12 Education* by the National Research Council of the National Academies. They incorporate science practices, crosscutting concepts, and core knowledge.
- Each performance indicator consists of core knowledge paired with one of the science practices. This is meant to guide teachers in the implementation of the practices, but not to limit instruction.

STATE ASSESSMENT

Grades 4th -6th

- The 2017 SCPASS will have the same number of questions as the 2016 SCPASS (4th-45 items, 5th -50 items, 6th -55 items).
- The blueprint will have a range of items (8-13) aligned to each standard. Standard 1 test items (the science and engineering practices) will be embedded throughout the test.
- The 4th and 5th grade tests will have 2-4 technology enhanced (TE) items.

Grades 7th-8th

- The 2017 SCPASS will have the same number of questions as the 2016 SCPASS (7th -55 items, 8th -60 items).
- The blueprint will have a range of items (8-13) aligned to each standard. Standard 1 test items (the science and engineering practices) will be embedded throughout the test.
- The 7th and 8th grade tests will each include one scenario set. A scenario set consists of a scenario (scientific text, graph, or data) with two test items related to the scenario.
- The 7th and 8th grade test will have 2-4 technology enhanced (TE) items.

STATE ASSESSMENT

Biology EOCEP

- The 2017 EOCEP will have 60 test questions.
- The blueprint will have a range of items (8-18) aligned to each standard. Standard 1 test items (the science and engineering practices) will be embedded throughout the test.
- The Biology EOCEP test will include two scenario sets. A scenario set consists of a scenario (scientific text, graph, or data) with three test items related to the scenario.
- The Biology EOCEP will have 2-6 technology enhanced (TE) items.

STATE ASSESSMENT

1) Technology Enhanced Items (TE)

These items require the student to interact with the item differently from multiple choice.

2) Scenario-based items

These items present a scenario for the student to read. The scenario is followed by 2-3 related questions.

Link to the OTT (Online Tools Training)

<https://wbte.drcedirect.com/SC/portals/sc>

This website is posted on the SCDE webpage. You must use Chrome browser to open it.

Science 4-8

Science

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THANK YOU KINDLY FOR JOINING US TODAY.

- Tomorrow I will post on Blackboard an essential question/task for you to respond to. Your response and comments will need to be posted before the next virtual session. In other words your posts will need to be completed before August 21st (11:59 pm).
- In order to receive points towards our time together, you must respond to the essential question/task as well as comment on at least 2 other posts from our online community.
- Please be mindful of commenting on other's posts "to encourage dialogue and reflection" versus simply stating "Great Point Nan".

*I will email you your username and password tomorrow for you to log on to Blackboard Learn.